



Stormwater 101 Workshop

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A photograph of a residential development featuring a large pond in the foreground. The pond is surrounded by lush green grass and tall reeds. In the background, there are several two-story houses with light-colored siding and dark roofs. A wooden walkway or bridge crosses the pond, leading towards the houses. The sky is bright with some clouds.

Sediment & Stormwater Presentation

Program Overview

Delegation

Plan Review

Inspection

Maintenance

Types of Facilities
Function & Maintenance

Maintenance Inspection

Successful Maintenance

Resources

In Delaware, you are never very far from water when land is developed.

The potential for impacts to ecosystems and natural areas is significant.



DNREC Sediment & Stormwater Program

Established by Law and Regulation Statewide 1991.

Requires all land disturbing activities over 5,000 square ft. to operate under an approved plan.

Program is delegated to local municipalities, conservation districts, and DeIDOT.

Delaware Department of Natural Resources and Environmental Control (DNREC) responsible for program performance statewide.

Sediment & Stormwater Delegation



- Sediment & Erosion Control
- Stormwater Management Review
- Construction Inspection
- Maintenance Inspection
- Outreach & Education
- Technical Assistance

Sediment & Stormwater Plan Review



- Conceptual Design Meeting
- Pre-application Meeting
- Plan Review
 - Stormwater Management
 - Erosion & Sediment Control
 - Downstream Analysis
 - Pollution Prevention
 - As-Built Review
- Technical Assistance

Sediment & Stormwater Inspection

- Pre-construction Meeting
- Routine Site Inspection
- Stormwater Maintenance Inspection
 - Including follow-up inspection
 - Meetings with contractors/HOA
- Technical Assistance
- Drainage Complaints
- Outreach & Education



Sediment & Stormwater Maintenance

- SCD is required to inspect all “closed out” projects and generate an inspection report.
- Approximately 2,000 closed out projects.
- SCD is required to follow-up on maintenance reports and inspect repairs.



Types of Stormwater Management Facilities

- Wet Ponds
- Dry Ponds
- Infiltration Ponds
- Bioswales
- Bioretention
- Filter Strips
- Constructed Wetlands
- Vegetated Roofs
- Underground Stormwater Systems





Wet Ponds

Provide quantity management

Improve water quality

Aesthetic appeal

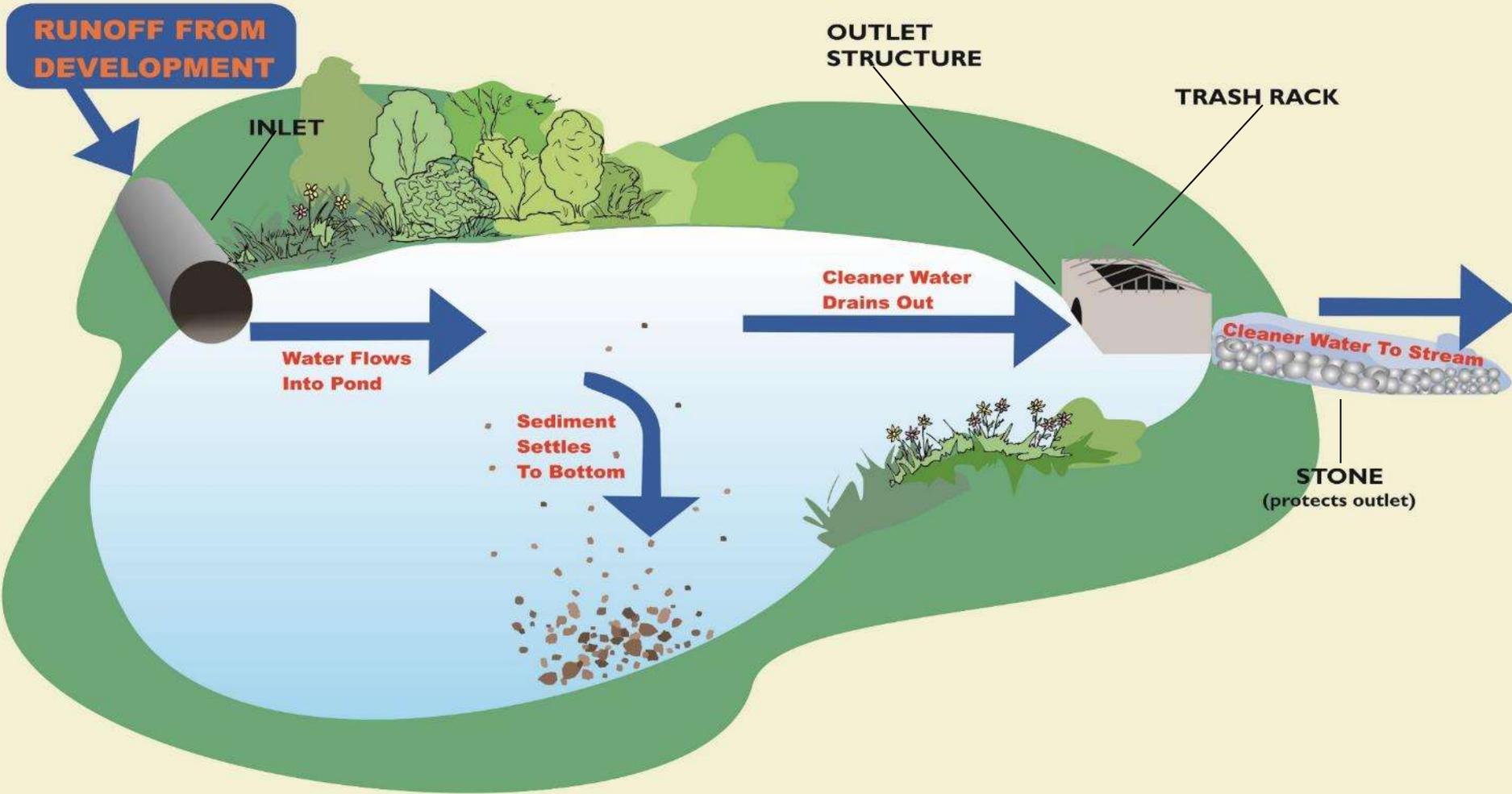
Increase biodiversity

Wildlife habitat

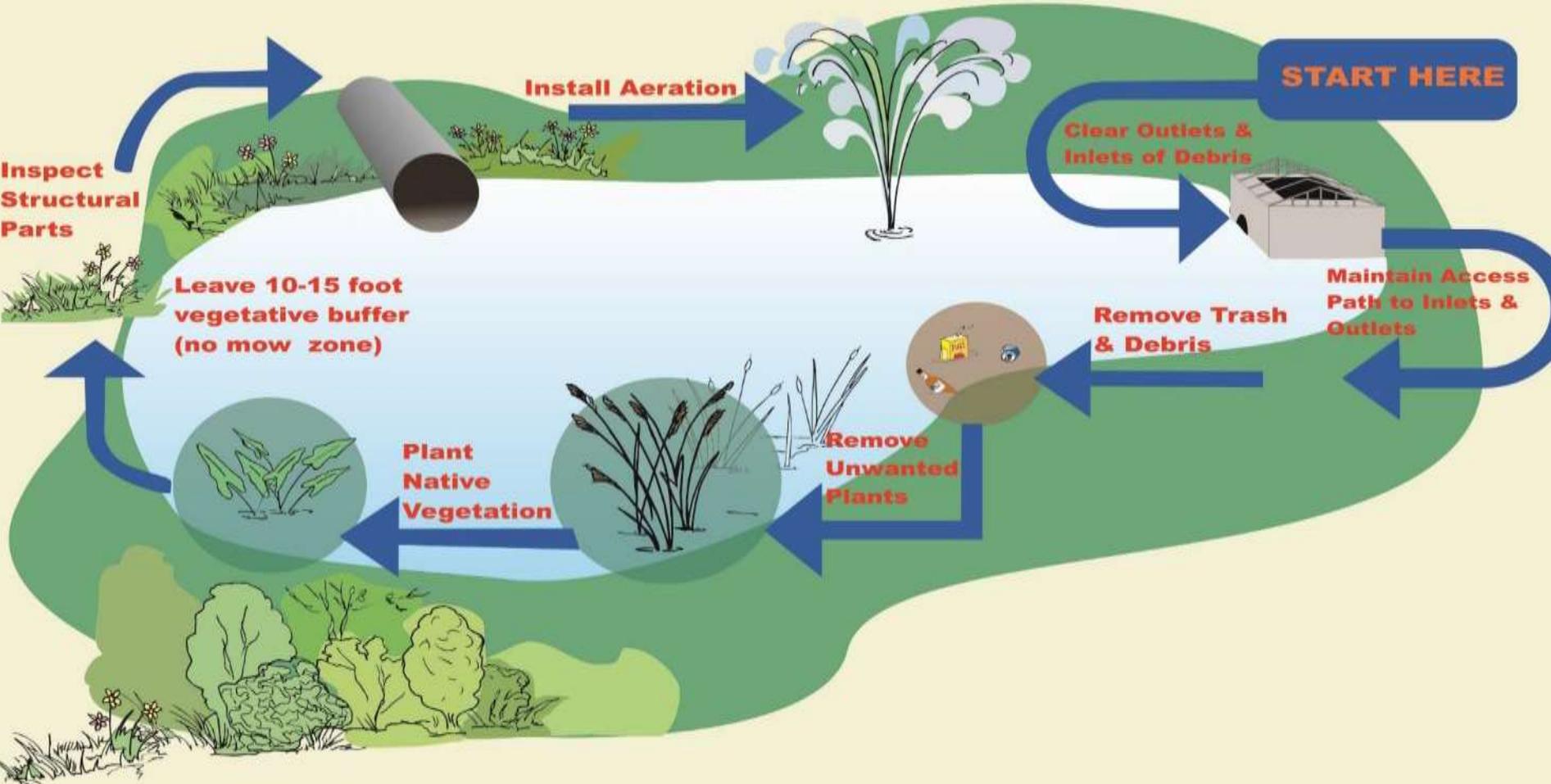
Flood prevention

Minimize erosion

Stormwater Pond Function



Stormwater Pond Maintenance



Routine Maintenance



- Remove trash and debris
- Check for erosion
- Inspect structures
- Monitor vegetation growth
- Inspect water level after rain events
- Monitor overall function

Remove Debris

Remove trash

Remove debris from inlets and outlet structures





Mowing

Mostly done by landscapers

10' access path to pond

Mow around inlets and outlets

Leave a buffer
(optional, but strongly encouraged)



Buffers

“No mow zone”
Work with landscaper

Must be group decision
Width optional



Buffer Benefits

Controls geese
Uptakes nutrients

Less erosion
Better wildlife habitat



Stabilize Banks

Buffers reduce erosion of side slopes

Overseed and stabilize as needed

Major stabilization
(hire a consultant)

- Erosion control matting
- Choosing durable grass species



Hire a Professional

Removal of sediment (Forebay cleanout)



Hire a Professional

Structural Stabilization
Pipe Failure
(Sinkhole)
Riprap

Vegetative Stabilization



Hire a Professional

Mosquito Control
(DNREC)

Kent & Sussex
(302) 422-1512



Dry Ponds

Ponds are designed to drain 48 hours after a rain event

Maintenance Challenges

- Invasive plant management
- Soggy pond bottoms
- Difficult to mow

If the pond is holding water

- Possible blockage
- Downstream obstruction
- Seasonal groundwater



Infiltration Basin

Ponds typically do not have a discharge outlet

Rely on permeable soils for infiltration

Low groundwater table



Infiltration Basin Maintenance

Crust forms over time

- Scrape topsoil surface to encourage/revitalize infiltration

Failure due to poor drainage and improper soils

- Hire a professional
- \$\$\$



Green Technology: Bioswale

Provides water quality treatment by removing sediment and nutrients

Low Maintenance

Provide routine maintenance

Inspect for drainage obstructions/holding water

Maintain grass height 6-8 inches – for increased water quality





Maintenance Inspection

Maintenance Inspection Report
Stormwater Facility Erosion
Before & After

Maintenance Inspection Report

Pond Components:

Embankment + Emergency Spillway

- Vegetation and ground cover adequacy
- Embankment erosion
- Animal burrows
- Unauthorized plantings
- Cracking, bulging or sliding of dam
- Slope protection or riprap failures
- Emergency spillway clear of obstructions and debris



Maintenance Inspection Report

Pond Components:

Riser + Principal Spillway

- Low flow orifice obstructed
- Weir trash rack maintenance
- Debris removal necessary
- Excessive sediment accumulations inside riser
- Pipe condition
- Outfall channels functioning



Maintenance Inspection

Debris & Cleanout



Ponds are overgrown with invasive species and woody vegetation which obstructs drainage.

Stormwater Facility Erosion

Riprap outlet is designed to convey 100-year storms non-erosively.

Events that exceed “design storms” have the potential to erode.





Stormwater Facility Erosion

Change in upstream watershed

Highly erodible soils

Improper installation

Significant rain event

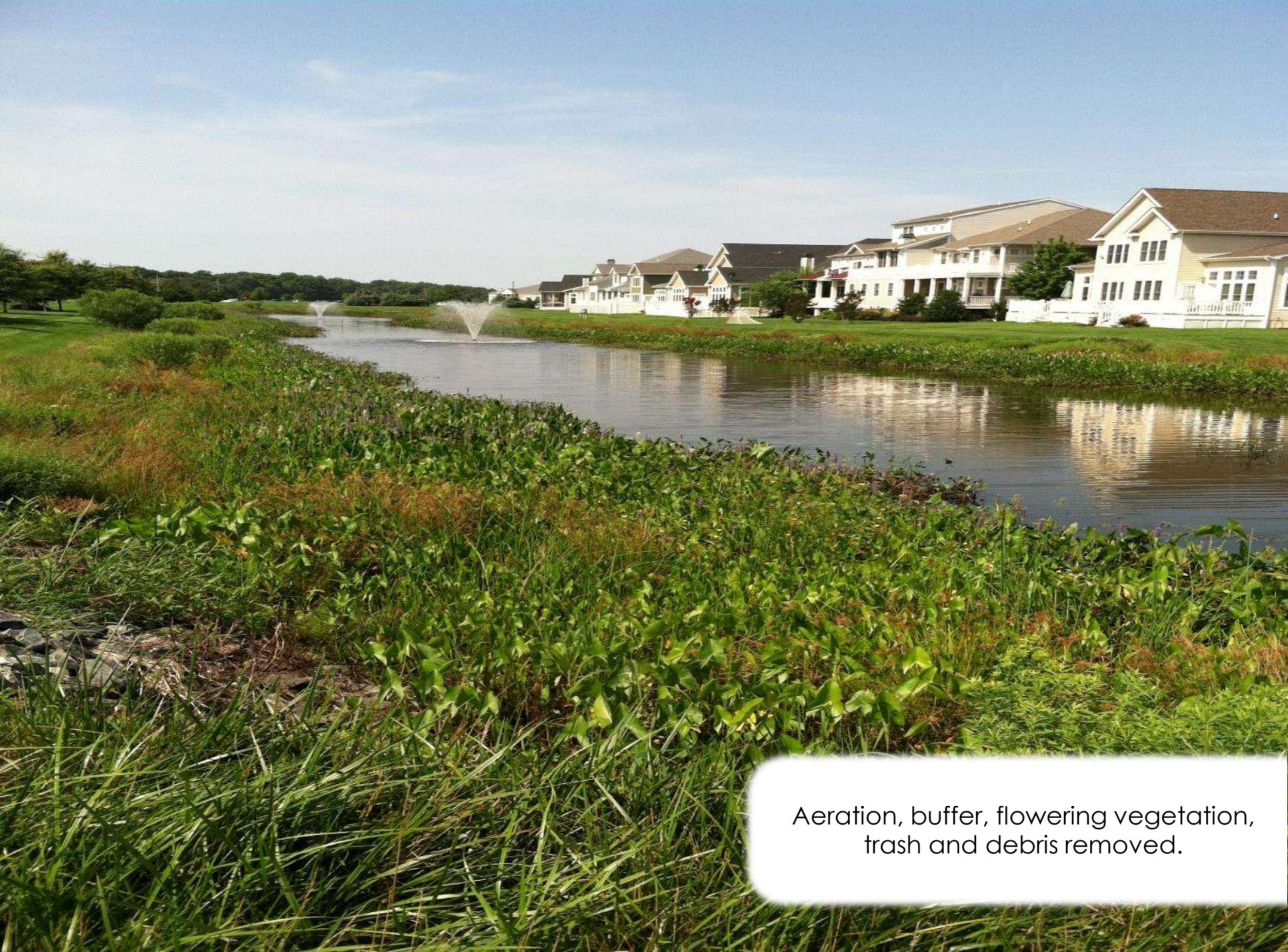




Successful Maintenance



Buffer, bird boxes,
flowering vegetation



Aeration, buffer, flowering vegetation,
trash and debris removed.



Aeration, buffer, flowering vegetation,
trash and debris removed.



Infiltration basins improve water quality and provide wildlife habitat.

Homeowner Technical Resources

Sussex Conservation District

302-856-2105
www.sussexconservation.org

**University of Delaware
Cooperative Extension**

302-856-7303
<https://www.udel.edu/cce/cooperative-extension/>

DNREC

<https://dnrec.delaware.gov/>

Division of Watershed Stewardship

<https://dnrec.alpha.delaware.gov/watershed-stewardship/>

Division of Fish & Wildlife – Mosquito Control

<https://dnrec.alpha.delaware.gov/fish-wildlife/mosquito-control/>

302-422-1512

**Sussex County
Public Works**

302-855-7703
<https://www.sussexcountyde.gov/public-works>



Sussex
conservation
district

PREPARE • PROTECT • PRESERVE

Thank you

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www.sussexconservation.org